

9310128-⑥
PD-AAC-574
3p.

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

ENTITY: DS Bureau

PROJECT: Tropical Soils/BNF - Puerto Rico

PROJECT NUMBER: 931-0128.11

I hereby authorize \$360,000 in grant funds for a three year extension (from December 31, 1978 to December 31, 1981) of the subject project (211(d) grant AID/csd - 2857) with the University of Puerto Rico for work on biological nitrogen fixation (BNF). This extension will be in incrementally funded with \$240,000 in FY 1979 and with \$120,000 in FY 1981 depending on the availability of funds.


Sander Levin
Assistant Administrator
for Development Support

NOV 24 1978

Clearances:

DS/AGR/TSWM:LFrederick FOO 11/9/78
DS/AGR/TSWM:GCorey BSR 11/9/78
DS/AGR:DPeterson BSR 11/11/79
DS/PO:RSimpson BSR 11/21
DAA/FN/DSB:TBabb BSR 11/21

References:

1. Action Memo: D. Peterson to AA/DS (attached)
2. Project Paper/Institutional Grant Project Statement
3. Grantee's Proposal

AGENCY FOR INTERNATIONAL DEVELOPMENT
**PROJECT AUTHORIZATION AND REQUEST
 FOR ALLOTMENT OF FUNDS PART I**

1. TRANSACTION CODE

A ADD
 C CHANGE
 D DELETE

PAF

2. DOCUMENT CODE
 5

3. COUNTRY/ENTITY DS/AGR RDA-4
 Type F. Section 211(d) Grant

4. DOCUMENT REVISION NUMBER

2

3. PROJECT NUMBER (7 digits)

931-0128.11

6. BUREAU/OFFICE

A SYMBOL DSB B. CODE 10

7. PROJECT TITLE (Maximum 40 characters)

Tropical Soils/BNF-Puerto Rico

8. PROJECT APPROVAL DECISION ACTION TAKEN

A APPROVED
 D DISAPPROVED
 DE DEAUTHORIZED

9. EST. PERIOD OF IMPLEMENTATION (for 3 yr. extension)

YRS 03 QTRS 0

10. APPROVED BUDGET AID APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. FY 9/30/78			H. 1st FY 79		K. 2nd FY 80	
		C GRANT	D LOAN	F GRANT	G LOAN	I GRANT	J. LOAN	L GRANT	M. LOAN	
(1) FN	145 I	090	-	800	-	240	-	0	-	
(2)										
(3)										
(4)										
TOTALS				800	-	240	-	0	-	

A. APPROPRIATION	4. 3rd FY 81		5. 4th FY 82		LIFE OF PROJECT		11. PROJECT FUNDING AUTHORIZED	
	O. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	1 - LIFE OF PROJECT	2 - INCREMENTAL LIFE OF PROJECT
(1) FN	120	-	0	-	1,160	-	2	-
(2)								
(3)								
(4)								
TOTALS		120	-	0	-	1,160	1	

12. INITIAL PROJECT FUNDING ALLOTMENT REQUESTED (\$000)

A. APPROPRIATION	B. ALLOTMENT REQUEST NO.	
	C. GRANT	D. LOAN
(1)		
(2)		
(3)		
(4)		
TOTALS		

13. FUNDS RESERVED FOR ALLOTMENT

TYPED NAME (C/NR/ SER/ FM/ FSD)

SIGNATURE

DATE

14. SOURCE/ORIGIN OF GOODS AND SERVICES

000 941 LOCAL OTHER

15. FOR AMENDMENTS, NATURE OF CHANGE PROPOSED

This amendment extends the life of this project/grant by three years (thru December 31, 1981) for continuing work on biological nitrogen fixation (BNF) which was initiated in July 1976. Of the \$800,000 approved thru 9/30/78, only \$120,000 was for work in BNF, the remaining \$680,000 was for work on soils. With this BNF 3 year extension total project funding for 211(d) work on BNF will be \$480,000.

FOR
 PPC/RIAS
 USE ONLY

16. AUTHORIZING OFFICE SYMBOL

17. ACTION DATE

MM DD YY

18. ACTION REFERENCE (Optional)

ACTION REFERENCE DATE

MM DD YY

ENVIRONMENTAL THRESHOLD DETERMINATION

TO: AA/DS, Mr. Sander Levin
THRU: DAA/FN/DS, Tony Babb
FROM: DS/AGR, Dean F. Peterson *Dean F Peterson*
SUBJECT: "Environmental Threshold Determination"

NOV 28 1978

Project Title: Tropical Soils/BNF - Puerto Rico
Project #: 931-0128.11
Specific Activity: 211(d) Grant Extension
Reference: Initial Environmental/Examination (IEE) contained in the subject Project Paper page 4 dated August 24, 1978

On the basis of the Initial Environmental Examination (IEE) referenced above and attached to this memorandum I recommend that you make the following determination:

X 1. The proposed agency action is not a major Federal action which will have a significant effect on the human environment.

 2. The proposed agency action is a major Federal action which will have a significant effect on the human environment, and:

- a. An Environmental Assessment is required; or
- b. An Environmental Impact Statement is required.

The cost of and schedule for this requirement is fully described in the referenced document.

 3. Our environmental examination is not complete. We will submit the analysis no later than with our recommendation for an environmental threshold decision.

Approved: *T. Babb*

Disapproved: *[initials]*

Date: 11-24-78

Clearances:
DS/AGR/TSWM:LFrederick *[signature]* 11/9/78
DS/AGR/TSWM:GCorey *[signature]* 11/9/78
DS/AGR:MMozynski *[signature]* 11/11/78
DS/PO:RSimpson *[signature]* 11/21

9310128 - ⑦
PD-AAC-574

AID 1960-1X (8-68)	DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT IMPLEMENTATION ORDER/TECHNICAL SERVICES		<input type="checkbox"/> Worksheet <input checked="" type="checkbox"/> Issuance																																				
			1. Cooperating Country World-Wide																																				
PIO/T	4. Appropriation Symbol 72-1111004		5. a. Allotment Symbol & Charge 154-31-099-00-34-11																																				
	6. Obligation Status <input checked="" type="checkbox"/> Administrative Reservation <input type="checkbox"/> Obligation <input type="checkbox"/> Sub-Obligation		7. <input checked="" type="checkbox"/> Original or Amendment No.: _____ <input type="checkbox"/> Mission																																				
8. No. of Technicians See Grant		9. Services to Start (Mo., Day, Yr.) Between: 1/28/71 And: 3/31/71		10. Duration (Months) a. Of Services: 60 b. Of Financing: 60																																			
11. a. Type of Action <input type="checkbox"/> AID Contract <input type="checkbox"/> Cooperating Country Contract <input type="checkbox"/> Participating Agency Service Agreement <input checked="" type="checkbox"/> Other Grant																																							
11. b. Authorized Agent AID/W																																							
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b. Other																																							
14. Mission References	15. Objective for which the Technical Services are to be used (Describe) This Institutional Grant, made under authority of Section 211(d) of the Foreign Assistance Act of 1966, is designed to strengthen, within the university of Puerto Rico at Mayaguez, their special competence in tropical soils science, as part of a collaborative effort with four other universities each of whom will specialize in specific problem areas. The grant anticipates a strengthened teaching capability, increased relevant research, close collaborative programs in the subject field, enlarged librarial materials and reference services, enlarged graduated level training and exchange programs, to the end that a capacity will be developed to provide training, consultant and advisory services to AID and other entities concerned with development programs.																																						
	16. Mission Clearances _____ Date _____		Mission Clearances _____ Date _____																																				
17. Date of Original Issuance _____		18. Date of this Issuance January 29, 1971																																					
19. For the Cooperating Country The terms and conditions set forth herein are hereby agreed to:		20. For the Agency for International Development  R. J. O'Brien																																					
_____ SIGNATURE		_____ SIGNATURE																																					
_____ DATE		_____ TITLE																																					
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Contracting Officer, Contract Services Div.

PROPOSAL FOR AID INSTITUTIONAL GRANT SUPPORT

UNDER SECTION 211(d) OF THE FOREIGN ASSISTANCE ACT OF 1966

Name of Applicant: University of Puerto Rico
Date of Application: June 1, 1970
Title: A Grant to Strengthen the Capabilities of the University of Puerto Rico in Special Problems of Tropical Soils *
Duration: Five years from the date established by the Grant
Amount of Grant: \$500,000

Summary:

This Grant will strengthen the existing competency of the University of Puerto Rico in a collaborative effort with Cornell University, North Carolina State University, University of Hawaii and Prairie View A & M College to provide training, related research, technical assistance and consultation in tropical soil science for increasing food production on soils of the tropics. This Grant will be used to:

- (1) Provide additional senior staff positions responsible for teaching Tropical Soils Management and Clay Mineralogy, areas where we have considerable strength. These senior staff members will also have responsibility in the related research program. The presence of top notch professors and scientists on the Mayaguez Campus will round up our strength in these areas. In addition, the Professor of

* One of a set of grants to five U.S. institutions to create a coordinated system of competence in tropical soil science.

of Tropical Soils Management will coordinate our efforts with those of other participating institutions. With this addition to the senior staff, Puerto Rico can more effectively handle graduate students majoring in these areas.

- (2) Provide a mechanism, in this case a visiting professorship, through which Puerto Rico can bring special competencies in order to reinforce the program in its area of least strength, i.e., Soil-Plant-Climate Interrelationships in the tropics. In this case, Puerto Rico will get reinforcements from other institutions, probably outside the four involved in this joint undertaking, to launch a pioneer program. Education and research relating response of tropical crops to climatic variables should provide a background of experience and applied information that will be of considerable value in interpreting soil-plant-climate interactions. The experience obtained at Puerto Rico will be readily available to the other cooperating institutions.
- (3) Provide support by adding a junior staff member (analyst-instrumental) to the existing senior staff so as to liberate part of their time and energy for more concentrated efforts on their areas of special competencies and to allow them to give special attention to their graduate students. This staff member will also participate in teaching instrumental analysis and techniques used in tropical soils.

- (4) Provide financial support to graduate students from Puerto Rico, including portions of their work while in residence at other participating institutions. In this way Puerto Rican students can get their degrees from the University of Puerto Rico with the added advantage of a Cornell, North Carolina, Prairie View and/or Hawaii training. This will be particularly important in the areas of Soil Microbiology, Soil Classification, Soil Morphology and Genesis and Soil Physics.
- (5) Provide facilities to graduate students from cooperating institutions, particularly Cornell, North Carolina, Hawaii and Prairie View to do their thesis work in a tropical environment. Puerto Rico could provide physical facilities plus guidance on tropical soils subject matter through a resident Thesis Director or Co-Director.
- (6) Provide for travel of contributing staff and students.
- (7) Modify existing soils courses and develop new courses in tropical soils for AID and other personnel involved in activities in the less developed countries.
- (8) Strengthen library and other informational services and provide for the preparation of training materials pertinent to the project.

THE RATIONALE OF THE COOPERATIVE PROGRAM

Grants by AID would expand and strengthen the existing competencies of the University of Puerto Rico, Cornell University, The University of Hawaii, North Carolina State University, and Prairie View A & M College in tropical soils. These Grants are to establish a collaborative program among these universities to develop special competencies, to provide such services as training, research, technical assistance and consultation in soil science for increasing food and fiber production on tropical soils.

The individual Grants will strengthen the following areas:

<u>Institutions</u>	<u>Field of Concentration</u>
1. Cornell University	Tropical Soils Cultural Systems
2. North Carolina State University	Soil Fertility Relating Plant Nutrition to the Physical and Chemical Properties of Tropical Soils
3. Prairie View A & M College	Soil Fertility Problems Under Savanna-Prairie Ecology
4. University of Hawaii	Biology and Mineralogy of Tropical Soils
5. University of Puerto Rico	Conservation and Protection of Tropical Soils

To implement the joint programs, each institution will:

1. Appoint a representative in a position of administrative responsibility to a program council whose function will be to provide policy and program guidance.

2. Appoint a project leader who will serve on a program executive committee, which will develop detailed plans of cooperation.
3. Reinforce existing competencies by appointment of resident and visiting staff in areas that will complement existing strengths of the five institutions.
4. Provide for support of students and faculty including exchanges of students and faculty to capitalize on the respective strengths of the cooperating institutions.
5. Make available physical resources, including office space, laboratories, equipment and other facilities and services, as well as existing staff competencies as the institution's contributions.
6. Develop a viable educational and research project on tropical soils and accommodate requests for training, technical assistance and consulting services as feasible and consistent with institutional resources and commitments.

The five universities already have institutional commitments to agricultural programs for developing nations and each has an interest in developing greater depth in their tropical soils capability. The five universities collectively represent a broad spectrum of ecological interests ranging from the laterites of Hawaii to the prairie soils of Texas and the highly weathered soils of North Carolina and

Puerto Rico. They represent a range of specialities and interests that complement each other so well that major facets of tropical soils are covered. Therefore, by considering the five universities as a coordinated group, an effective critical mass is achieved in building United States competence in tropical soils.

Cornell University's soils program is heavily oriented to graduate education and research. They have organized courses in tropical soils and crops and experience in international development in the Philippines.

North Carolina State University has a long history of research in soil fertility and in international training and technical assistance. They are located in a warm, humid environment similar to many parts of the tropics.

Prairie View A & M College has a program of research and training that involves crop production and soil fertility improvement under prairie conditions and a background of technical assistance.

The University of Hawaii is uniquely located geographically to serve the Asian areas in research and training programs, and they have an enviable record of technological innovation and exchange. They are located in an area of intensive, highly developed tropical agriculture.

The University of Puerto Rico has long experience with production of food and forage crops on tropical soils and in soil conservation and management. It is Latin America oriented in culture and language.

UNIVERSITY OF PUERTO RICO'S CAPABILITY

The Mayaguez Campus of the University of Puerto Rico offers an exceptional range of resources for international programs which makes it valuable as a site for resident teaching of tropical soils with a related research program. The various colleges and professional schools of the University present a great variety of courses dealing with Caribbean, Latin-American, and international studies in general. In addition, an Office of International Agricultural Programs have been recently established. The Director is coequal with the Directors of the Agricultural Extension Service, the Experiment Station and the Office of Programs and Plans. Among other things, this Office is developing a curriculum in international tropical agriculture.

The Mayaguez Campus of the University of Puerto Rico has had over many years numerous undergraduate students from Latin-American countries. The recent development of graduate programs in agriculture have attracted many Spanish-speaking students. The University expects continued growth in both directions. Recent exchanges with the Dominican Republic point towards the need of strengthening these opportunities of service. The University at Mayaguez will probably become more involved in the years ahead in developing cooperative projects which offer a potential value for neighboring countries.

The Mayaguez Campus of the University of Puerto Rico is in a unique position to provide for education and research of value for

Latin America. Puerto Rico serves as the crossroads for the Western Hemisphere, blending both cultures of the Americas. The enrollment at the College of Agriculture is an index of the importance of Puerto Rico in this respect. Approximately 20 percent of the students enrolled in agriculture come from tropical Latin-American countries and adjacent Caribbean islands.

The Mayaguez Campus of the University of Puerto Rico is a Land-Grant institution. It is a coeducational, bilingual and non-sectarian University. It was fully accredited and admitted to membership to the Middle States Association of College and Secondary Schools in 1946.

The role of our University cannot be confined to the narrow geographical limits of the Island. There is an immense potential in our very close Caribbean neighborhood and in our blood and language of sister countries in Latin America. We are committed to help ourselves and to help them all.

In the area of tropical soils research, the University of Puerto Rico Mayaguez Campus is involved in a major project with Cornell University, with U.S.D.A. cooperating under the auspices of A.I.D. for the solution of soil fertility problems of the humid tropics.

The Department of Agronomy within the Faculty of Agriculture has a professional staff of 17 scientists. The Extension Service has 3 full-time professionals dealing with soils, soil conservation and irrigation and drainage. At the Agricultural Experiment Station, the corresponding unit (Department of Agronomy and Soils) includes 52

professional men. Of the total, 18 members devote their full time to research in areas such as soil genesis, morphology and characterization; soil conservation; soil classification and survey; soil chemistry and fertility; soil microbiology; soil-plant-water relationships and agricultural climatology. This research is conducted along the Island at the main station at Rio Piedras and at six outlying substations, strategically located around the Island representing a tremendous range in tropical climate and soil.

The staff is competent in important areas of soil science which will be the essential elements of this proposed joint program. More than 50 percent of the personnel hold a Ph.D. degree.

Seventeen courses are offered in the area of soil science and eleven supporting courses are offered by the Departments of Agricultural Engineering, Civil Engineering, Chemistry, Geology and Horticulture.

Twenty-six research projects are currently underway in the areas of agricultural climatology, irrigation, drainage, soil fertility, soil genesis and morphology and tropical soils management.

In the field of soil science, the Mayaguez Campus contains laboratories available for research and teaching in soil chemistry, soil physics, soil microbiology and others with all the basic equipment (ovens, extractors, balances, hot plates, incubators, autoclave, refrigerators, centrifuges, electronic equipment such as pH meters, titrometers, photometers, etc.) instrument rooms, balance rooms,

storerooms, greenhouses, lath-houses, and office facilities.

Specialized equipment includes Super-Centrifuge, X-Ray diffraction, X-Ray Fluorescence, Flame Photometer, Beckman DBG, B & L Spectronic 500, Jarrel-Ash Atomic Absorption, Flame Emission Spectrometer, thin layer chromatograph, paper chromatograph, gas chromatograph, Technicon Auto Analyzer and others. There is ready access to all specialized equipment in the Puerto Rico Nuclear Center nearby on the Campus grounds.

Field facilities comprise eight experimental farms with over 2,500 acres available for plot work.

UNIVERSITY CONTRIBUTION

Funds provided by this Grant will not replace existing funds for current projects. Also, activities carried out under this Grant will be additive to existing and planned programs of the University. In direct support of this Grant, the University will provide:

1. Administrative costs including the time of Department Heads, Deans and other senior officers of the University.
2. Access to relevant laboratories, field research facilities, and libraries.
3. Office, classroom and auditorium space for faculty, students, and special meetings or symposia related to the program.
4. Consulting services of the faculty not directly associated with the Grant.

ADMINISTRATIVE ORGANIZATION

The University will administer the Grant through normal administrative channels by normal operating procedures of the institution. The project leader will be responsible for operations and will report to the Head. (To be expanded by the University of Puerto Rico)

OBJECTIVES AND SCOPE

The major objective of this proposal is to increase the capacity of the Mayaguez Campus of the University of Puerto Rico to contribute to the joint efforts of the University of Hawaii, North Carolina State University, Cornell University, and Prairie View A & M College to provide education and training for the utilization of soils of the tropics. The primary focus would be on the soils of the humid tropics and how they might be most effectively utilized for sustained and profitable food production. As an essential component of meaningful education and training for the objective, however, the program would include supporting studies in applications of meteorology, the plant sciences, the animal sciences, and the social sciences to the tropical environment.

An important and intimately related objective is to increase the Institution's capacity to conduct research in tropical soils and participate in technical assistance programs involving utilization of tropical soils. Both are necessary adjuncts of effective training for professional manpower committed to productive use of tropical soils

and are, in addition, compelling ends in themselves consistent with the service to AID which is inherent in Section 211(d) of the Foreign Assistance Act of 1966.

The objectives will require inputs from at least four areas of soil science: (a) the study, characterization, and classification of tropical soils as found in the field; (b) plant nutrient requirements for the production of food crops on different tropical soils; (c) soil-water-plant relations of tropical soils; and (d) the conservation and protection of tropical soils for sustained production. They will, in addition, require supporting inputs for perspective of (a) the impact of climatic conditions on soil and crop behavior, (b) water management and (c) the economic and social environments within which knowledge and technology must be applied.

The University will draw upon its existing resources to satisfy these requirements as fully as possible. The Grant will provide resources to make it possible for the Mayaguez Campus to share its competencies and facilities with North Carolina State University, Cornell University, Prairie View A & M College, and the University of Hawaii and they, in turn, to (Page 6 of the original proposal is missing and part of it may need to be added here.)

OPERATIONAL PLAN

(This needs review and development by the University of Puerto Rico. Can be condensed.)

1. Professional Staff:

a. Professors of Tropical Soils Management and Clay Mineralogy.

The Grant will provide for two full-time senior staff members serving in the areas of Tropical Soils Management and Clay Mineralogy. Their function will be to incorporate added knowledge and experience into the teaching, and related research program.

b. Visiting Professor and Scientist.

The Grant will provide a position which will be held for visiting authorities who can bring to Puerto Rico special knowledge and leadership in the area of Tropical Soil-Plant-Climate Interrelationships, one in which probably the four cooperating institutions are weak on. This professor will provide leadership to awaken students and staff to the unusual importance of this field of science in agricultural production in the tropics. He will also plan a research program in this area which will be developed under his supervision. This program will be initiated by providing guidance and supervision to graduate students from Puerto Rico and the other participating institutions in their thesis work while in residence at a tropical environment.

c. The Grant will provide for the services of an Analyst (instrumental) which will free our existing staff from routine instrumental work. He will also be useful in training students in the use and maintenance of highly specialized equipment and methods used in tropical soils research.

d. Existing Staff.

The Grant provides support for the four existing staff members engaged mainly in teaching, with some research, and the additional 24 staff members devoted to full-time research activities in the Experiment Station and education in the Extension Service. They will participate in the supervision of local graduate students in the program and also in advising exchange students. The normal activities of these men will contribute to the program elements elsewhere described. With the institutional support provided, they will also be in position to participate in the additional functions that this plan conveys.

2. On-Campus Academic Training

Under the Grant, 6 assistantships will be made available to qualified graduate students (foreign, U.S. and Puerto Ricans) who have a career commitment to tropical soil science and closely related fields. Three of these will be accepted as candidates for advanced degrees, or in special cases, as

non-candidates. Three will be accepted as exchange students from the other three cooperating institutions. From two to five other students will be accepted in the program as candidates for advanced degrees under resources currently available.

Candidates for the M.S. degree majoring in soil science and emphasizing tropical soil utilization will minor in areas pertinent to tropical agriculture, such as agricultural economic development, crop production, food science, tropical plant pathology, tropical animal science, etc.

These students will have access to a program in soil science that includes soil chemistry, soil fertility, soil physics, soil microbiology, soil classification and genesis, soil conservation, and soil mineralogy in addition to the work specific to tropical soils. Of these, the greatest strengths for the tropical environment are in Soil Management, Clay Mineralogy, Irrigation, Conservation and Management of Water. Students of cooperating institutions would be expected to take advantage of these offerings and other courses specific to the tropics in animal, plant, and social sciences through the exchange assistantships.

The exchange students will select course work from soil science or supporting fields chosen specifically to complement their training at institutions in which they are registered for degrees. They will take advantage of the tropical environment available at Puerto Rico to develop their thesis.

While the emphasis of the program is on post graduate training, it does not exclude undergraduate work. These undergraduates will have access to most of the elements of this program.

3. Training and Research in the Tropics.

The Grant will enable the candidates for advanced degrees from Cornell and North Carolina to do their thesis research, or to solve a professional problem, in a tropical environment.

The work will be done in collaboration with the Mayaguez Campus on problems mutually acceptable to the major advisor and to our institution. Preferably, the problems will be parts of priority research programs being carried on or contemplated, and will be of sufficient importance to the participating institution so that it would be willing to commit some of its available resources and staff time. Although we expect periodic visits of the responsible Cornell or North Carolina faculty for direction of the student's project and consultation with the onsite supervisor, the day-to-day operations will be supervised by a designated competent local individual. This Grant will provide support for some students from Cornell University and from North Carolina State University to get training in the tropics. The existing Cornell-Puerto Rico research project will provide other opportunities.

4. Training Through Exchange of Students.

In addition to exchange of students with the cooperating institutions discussed under items 2 and 3 above, the Grant, with parallel commitments of the other three universities, will make it possible for Puerto Rican students to study at any one of the other three institutions mainly for work and training in areas where Puerto Rico has not developed strength. It should be noted that when a resident student goes to one of the other institutions as an exchange student, his stipend will be available for an additional student in residence. Moreover, the cross-fertilization of knowledge by a flow of students among institutions is, in itself, an effective educational device, as is the exchange of faculty described under item 1.

5. Training Schools, Short Courses, and Individual Training.

Although not specifically financed under the Grant, the additional resources will provide an opportunity to respond to requests for special training of groups or individuals financed by outside sources. Individuals supported by AID country missions will benefit from the strengthened program at Puerto Rico equally with those supported by the Grant, whether or not they are enrolled in degree programs. With outside support, they could also participate in an exchange program with the same advantages as others. Similarly, groups of students

having outside support may be accommodated more adequately for short courses and training schools with appropriate supplementary financing for commitments beyond the regular course offerings of the program.

6. Research and Technical Assistance.

Inasmuch as Cornell and North Carolina are far removed from the tropical environment, their program will depend upon collaboration with the other two institutions primarily for these elements. Faculty research will be largely associated with students programs, though there is also a major faculty commitment to work with Cornell University under a separate AID contract. This will be a major vehicle for graduate student research of both institutions as well. Collaboration with the other two universities on research projects will be explored.

7. Maintenance of Continuity.

An important consequence of the Grant is to make possible follow-up and continuing contacts with students who have completed their academic work and are on the job in the other tropical areas. Maintaining contacts and providing technical backstopping when needed will give essential continuity needed in a training and research program concerned with the utilization of tropical soils. Special training programs

described under item 5 could serve AID and other personnel involved in technical assistance in tropical soil and crop management, and could also be used as refresher courses for former students.

8. Library, Teaching and Training Materials.

The availability of teaching and training materials on soil and crop management in the tropics is rather limited. The Grant would provide support for some aspects of this activity and also for informational services as needed. Puerto Rican professors involved in this project have had ample and continued tropical experience in soil science and have a wealth of knowledge which can be tapped. The Grant provides capabilities for developing teaching and training materials, and informational services.

EXPLANATION OF BUDGET ITEMS

1. Professional Staff:

a. Professors of Tropical Soils Management and Clay Mineralogy.

The Grant will provide for two senior professors to devote full time to teaching, research and technical assistance. They will teach courses in advanced tropical soils management and clay mineralogy, serve on students' committees and coordinate soil teaching and research in their areas of competency.

One of them will serve as Puerto Rico's project leader and representative to the Executive Committee of the four university program. He will develop and maintain relationships with individuals and participating institutions for commitments relevant to the programs including arrangements for exchange of students, for Cornell and North Carolina students experience in our tropical environment, etc.

b. Visiting Professorship.

The Grant will provide a position of academic rank to be used to bring special expertise and experience to the project. The position will be available to faculty members of the other three institutions, at least part of the time. However, it will be used mainly to bring authorities from other institutions. Any funds available from those allocated for visiting professors may be used for honoraria for guest lecturers.

c. Analyst (Instrumental)

The Grant will provide a highly skilled junior staff member to handle specialized laboratory equipment such as X-ray diffraction, Jarrel Ash Atomic Absorption-Flame Emission Spectrometer, Technicon Auto Analyzer and similar others. This will liberate existing senior staff members from these routines, but are important tasks.

2. Graduate Assistantships

a. Exchange Assistantships.

The Grant will provide stipends and normal support for three graduate assistantships which will be held on a priority basis for students of the other three institutions. Such students would come to Puerto Rico to reinforce their programs from special competencies of Puerto Rico, to take advantage of the presence of visiting scientists, to work on their thesis or to take advantage of the tropical environment in rounding up their training. These would normally be awarded for a period of one semester or one year, but could be extended by mutual agreement to as much as two years. In the event that no exchange student applies, the assistantships would be available for support of Puerto Rico students in the program.

b. Puerto Rico Resident Assistantships

The Grant will provide for three graduate assistantships to be held for students regularly enrolled in the program at Puerto Rico. The three assistantships under this Grant would be limited to students in the program and would carry duties associated with the program. These three assistantships may be used for support of exchange students under appropriate circumstances.

3. Non-Professional Staff.

The Grant provides for one stenographer who will serve the professors of soils and the visiting professor. She will serve others among the professors concerned with the program for those special courses or seminars, training sessions, and other operations which are integral parts of the project.

Puerto Rico will provide most of the funds necessary for technicians to service the operation who will be responsible for teaching aids, assembly of teaching materials, laboratory supplies, greenhouse supplies and facilities, photographic and copying services and materials, soil monoliths and samples, reference materials and related services under the direction of the project leader. This will be an important factor in the development of teaching and training material discussed under item 8 of the operational plan.

4. Staff Support

The Grant provides for travel and subsistence of staff, including that of the Dean or his representative to meetings of the Council, that of visiting professors to and from Puerto Rico, and that of the professors of soils and other staff on business of the project. Such business would include travel to supervise students under training at participating institutions and travel for conferences or research directly concerned with the project.

The allocation for staff support also provides for expenses of the professors of soils and visiting professors for supplies and services specific to their activities for the project. The items included would be those distinct from general departmental supplies and services common to all projects.

5. Student Support

The Grant provides for travel of Puerto Rico graduate students for complementary training at cooperating institutions and for cost of their programs which are not covered by the host institution. It also provides for normal departmental support of both resident and exchange students at Puerto Rico. It includes tuition and fees, travel to one scientific meeting, local travel for the program, and miscellaneous supplies associated with program operations. It does not include books, personal supplies and other personal costs incidental to their programs.

6. Departmental Support

The Grant provides for those costs over and above normal operating costs which the department will incur for this program. This includes communications, data processing, copying services, analytical services, typewriter rental, laboratory supplies, and office supplies and services in support of the

professors of soils, visiting professors and students. It includes incidental costs associated with special seminars and training schools, but the primary costs of training schools and major conferences will be derived from other sources.

COPY TO: [unclear]

DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT IMPLEMENTATION ORDER/TECHNICAL SERVICES	1. Cooperating Country TA BUREAU 3169128	Page 1 of 2 ^{20 p.} Pages
	2. PID/T No. 931-11-120-128-73	3. <input checked="" type="checkbox"/> Original or Amendment No. _____
	4. Project/Activity No. and Title Classification and Microbiology of of Tropical Soils: University of Puerto Rico	

DISTRIBUTION	5. Appropriation Symbol 72-11X1023		6.A. Allotment Symbol and Charge 402-31-099-00-34-6		6.B. Funds Allotted to: <input checked="" type="checkbox"/> A.I.D./W <input type="checkbox"/> Mission																											
	7. Obligation Status <input checked="" type="checkbox"/> Administrative Reservation <input type="checkbox"/> Implementing Document				8. Funding Period (Mo., Day, Yr.) From 6/30/76 to 6/30/78																											
	9.A. Services to Start (Mo., Day, Yr.) Between 06-15-76 and 07-15-76				9.B. Completion date of Services (Mo., Day, Yr.) 6/30/78																											
	10.A. Type of Action <input type="checkbox"/> A.I.D. Contract <input type="checkbox"/> Cooperating Country Contract <input type="checkbox"/> Participating Agency Service Agreement <input checked="" type="checkbox"/> Other 211(d) Grant																															
	10.B. Authorized Agent AID/W																															
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	B. Other																															

13. Mission References

14. Instructions to Authorized Agent
 This requests a two-year resumption/revision of the 211(d) grant in tropical soils (AID/csd-2857) to the University of Puerto Rico, the substance, budget and scope of which are contained in the attached proposal. It should be made effective June 30, 1976. It calls for two focuses: (1) development of knowledge and capabilities regarding the process and management of biological nitrogen fixation in the tropics, and (2) it maintains Puerto Rico's developed capacities in tropical soils in a clarified utilization mode so as to be of service to USAIDs, LDCs and other international development programs and to foster a worldwide network of competence and interest in effecting improvement in soils management to the advantage of LDC small farmers. (cont'd page 2).

15. Clearances - Show Office Symbol, Signature and Date for all necessary Clearances.

A. The specifications in the scope of work are technically adequate TA/AGR/SWM: TGill <i>TGill</i> Date: _____ TA/AGR/SWM: LFrederick <i>LFrederick</i> Date: _____	B. Funds for the services requested are available TA/PPU: CMolfetto <i>CMolfetto</i> Date: 6/11
C. The scope of work lies within the purview of the initiating and approved Agency Programs TA/AGR/SWM: DPlugkott <i>DPlugkott</i> Date: _____ TA/AGR: Lhesser <i>Lhesser</i> Date: _____	D. TA/PPU: MZozynski <i>MZozynski</i> Date: 5/28/76
E. TA/AGR: RHolmes <i>RHolmes</i> Date: _____ TA/AGR/SWM: SEngberg <i>SEngberg</i> Date: _____	F. TA/PPU: TELiot <i>TEliot</i> Date: 5/28/76

16. For the cooperating country: The terms and conditions set forth herein are hereby agreed to	17. For the Agency for International Development Signature: <i>John Gunning</i> Title: Chief, TA/PPU	18. Date of Signature 6/10/76
Signature and date: _____		
Title: _____		

CONTINUATION
SHEET

FORM SYMBOL

DEPARTMENT OF STATE
AGENCY FOR
INTERNATIONAL DEVELOPMENT

TITLE OF FORM

 Worksheet IssuancePAGE 2 OF 2 PAGES1. Cooperating Country
TA BUREAU

2.a. Code No.

2.b. Effective Date

2.c. Amendment
 Original OR No: _____

3. Project/Activity No. and Title

Classification and Microbiology of Tropical
Soils: University of Puerto RicoIndicate block
numbers.

Use this form to complete the information required in any block of a PIO or PA/PR form.

14 (cont'd)

This program is part of a joint effort with three other universities (Hawaii, Cornell and North Carolina State) each of which has been assigned specific scientific specialities relative to the field involved. The grant anticipates strong collaborative programs and its outputs will enable the institution to provide the needed services, technology and problem awareness in the LDC's for AID and other agencies concerned with development programs.

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Proposal for Continuing Support under
the Agency for International Development
Institutional Grant Program

Applicant:	University of Puerto Rico
Date:	August 1975
Grant Title:	Taxonomic Classification of Soils and Biological Nitrogen Fixation
Amount and Term of Original Grant plus Amendments:	\$500,000: March 4, 1971 to March 3, 1976
Amount and Term of Proposal:	\$300,000 extended to March 3, 1978
AID Sponsoring Technical Office:	Office of Agriculture, Bureau for Technical Assistance

Grant Project Statement
211(d) Institutional Grant
University of Puerto Rico

Contents

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III. Grantee Commitment to Long-term Involvement	4
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Institutional Grant Project Statement
Extension/Revision
AID/csd-2857
University of Puerto Rico
Taxonomic Classification of Tropical Soils

I. Relevance of Problem and Need for Expertise

Soils are the major resource of the developing countries for crop production. Obviously, it is important to know, determine or predict their response to management inputs and practices. There are roughly three billion acres of potentially arable soils that could be used for crop production. Less than one-third of that area is now in use. Little organized knowledge is available to make the most of these soils in a minimum of time without dangers of degradation. In temperate regions, particularly in the U.S.A., soil survey and classification have historically been recognized as essential prerequisites for profitable agricultural development because they provide an inventory and appraisal of land resources and thus the key elements in land use planning and land management.

On the other hand, in only select parts of the tropics have the soils been classified to some degree or level. Various classification systems such as French, U.S., FAO/UNESCO, etc., have been utilized in the developing countries but not much effort has been given to correlate the soils across these systems. Thus there is little possibility of transferability of soil management knowledge for crop production from one tropical region to another. The most comprehensive classification system to date, the U.S. Soil Taxonomy, has not been adequately

tested in the tropics. The U.S. system holds great potential for the tropics in the transferability of agro-technology. But it is not known whether the U.S. system needs improvement in terms of additional parameters when considering tropical soils.

AID is committed to increased food production and bettering the lives of the small farmers in the LDCs. Its resources - hundreds of millions of dollars in bilateral loans - are all geared to that effect. Problem solving and technology transfer is central to AID's objectives. Soil classification is of prime importance to this proposition. In the U.S., the Soil Conservation Service of the USDA and the Land Grant Universities have traditionally assumed the leadership in the field. Yet, the relevant knowledge developed has been largely confined to soils of the temperate zone as tropical soils comprise only a small portion of the U.S. AID's interests in land resource development in LDCs, however, require expertise in various systems of classification used in the tropics, their mutual correlation to aid agrotechnology transfers, and their interpretation for the purposes of food production.

Increasing numbers of LDC officials have come to appreciate the value of land resource appraisal for national planning as a way to predict soil behavior, identifying its best uses and estimating their productivity. The requests for assistance in the subject field will multiply rapidly over the coming years. Only the U.S.A. can provide such help on a significant scale. The U.S. institutions can provide the technology and advisory capacity.

II. Grantee Performance and Results to Date

The report by an Agency panel which conducted a fourth year comprehensive review of the grant considered the University of Puerto Rico's (UPR) performance as below par. The University mentioned numerous problems which might reflect on their performance, including: vagueness of the original grant objectives; relatively poor starting technical base; administrative and political problems between two campuses, the Experiment Stations and the Extension Service, and the low staff salary scale at UPR.

On the other hand, as a U.S. institution UPR has a number of strong factors going for it:

- (a). It is located in the tropics and has varied climatic and soil situations for crop production.
- (b). its Spanish heritage (language and culture) is a big plus where communication with Latin America is concerned.
- (c). Its commitment to international dimensions.
- (d). Its commitment to the well-being of small farmers and their crops coincides with the Agency interests. The University is capable of producing technology packages for the small farmers to grow food crops.
- (e). The Island of Puerto Rico has a great deal of soil management experience which can be related to soil classification for ready transference to LDCs with similar soils. Perhaps herein lies UPR's greatest strength which is available that needs to be put into an appropriate information system.

In the subject matter area of classification of tropical soils UPR has made reasonably good progress. A few years back it hired a brilliant pedologist who is classifying soil series of the Island of Puerto Rico in four major world soil classification systems. He is also a co-author to a similar publication for the State of Hawaii. As an outgrowth of competence developed through the grant, UPR was able

to sign a research contract with AID entitled "Crop Production and Land Potential of Benchmark Soils in Latin America". Under the contract UPR will test a hypothesis of transference of agro-technology from one tropical region to another on the basis of latest U.S. soil taxonomic classification systems.

The University of Puerto Rico has established linkages with a number of institutions in LDCs. These include CIAT and ICA in Colombia, EMBRAPA and EPAMIG in Brazil, and CNIECA in the Dominican Republic. In addition to the close ties developed with the sister universities of COST, UPR has fostered contacts with SCS, FAO and the Universities of Ghent, Belgium and Goettingen, West Germany. Under a contract with AID's Regional Office for Central American and Panama, UPR is engaged in a training program for graduate students from Central American Universities.

III. Grantee Commitment to Long-term Involvement

The University is definitely committed to a long-term involvement in all aspects of tropical soils as this subject matter is of crucial importance to Puerto Rico's own agriculture. As a direct result of the grant the staff of the soils section of the Agronomy Department was increased by two. The appointments were for an Assistant Professor and an Associate Professor both of whom now hold tenured positions at the University. Recently, the University has indicated its intention to add two more members to its faculty to give release time for consultancy in tropical soils.

As evidenced by UPR's contract with ROCAP, the University is involved with USAID programs, particularly in Latin America. UPR has signed a research contract with TA/AGR in the area of soil taxonomy which may last about five years. This work will be done in 2 or 3 Latin American countries in addition to Puerto Rico. The program is closely coordinated with another AID research contract at the University of Hawaii with a focus on soils in Africa and Asia.

The University's involvement in the soil research contracts and the proposed grant as well as with the Consortium on Soils of the Tropics (COST) is bound to create a longlasting commitment. Its ability to assist the LDCs in their development process will greatly increase as: greater soil classification insight is gained in the tropics; the classification system is improved for the tropical soils; the old and new classification systems are correlated; the hypothesis of agrotechnology transference is worked at; basic response data on soil families is put into an information system for LDC use; and the LDC soils are classified for land use planning. It is likely that as a result of such involvement and progress, UPR and the University of Hawaii will become a bastion of almost indispensable agro-technology source for the developing tropical world.

The Administration of UPR at Mayaguez, especially the chancellor, was personally involved in the original grant and is deeply interested in and supportive of the University's international programs. The staff of the Agronomy and Soils Department have actively participated in numerous international seminars and workshops. The LDC student

enrollment in the Department has steadily but surely increased during the grant period. Puerto Rico being a tropical island, any tropical expertise that is created there will stay there. The mere fact that UPR has already given tenured position to two faculty members who were hired originally on grant funds suggest Puerto Rico's commitment to the soils program. Firm indication by UPR that two more staff members will be recruited in the soils programs insures continuity of commitment to soils problems of LDCs if support can be maintained for overseas work. To maintain a viable program for overseas work and special on-campus international activities will require continued support from sources such as AID, foundations, and other national and international agencies. It is estimated that the University contribution for support of the 211(d) grant has been approximately one-half that of the grant itself. This is based on the average cost for salaries, fringe benefits, and support per faculty equivalent.

IV. Rationale for Revision/Extension

Cognizant of the need and the potential pay-off of soil surveys, most LDCs are engaged in some kind of soil survey activities. The value of these surveys for agricultural development depends in large measure upon the soil classification system they employ. Ideally, a soil survey should provide, through soil classification, information on the chemical, physical, mineralogical and environmental properties of the soil units delineated on the soil maps. On the basis of this data soils can be appraised for their potential for crop production and other

soil uses.

Vast areas of potentially arable soils in LDCs, particularly in South America and Central Africa, are presently not used for intensive crop production. In view of growing population pressure and increasing food demands, part of this area needs to be developed in the near future. As a consequence soil survey activities will be an increasingly more important aspect of the agricultural development scene. In order to be useful, soil surveys must be complemented by a strong soil correlation and characterization program and must be based on an adequate soil classification system of reasonable scientific standards. Also, land use planning requires a careful analysis and judicious interpretation of soil surveys by knowledgeable experts.

The Agency's increased emphasis on programs directed toward assistance to LDC governments in resource management requires expertise in problem analysis and action programs directed toward efficient and effective use of soil resources. The major pool of expertise that can respond to AID requests for assistance in this area is found at land-grant universities which are involved in tropical agriculture or which are located in the tropics.

The University will continue to be committed to agricultural development in the tropics as this is directly related to Puerto Rico's own problems. However, the University cannot provide funds for international programs. While funding from sources other than AID could sometimes be procured for development activities in LDCs, such funds are generally not available on a continuing basis. Discontinuous

schemes of funding do not allow the University to engage in sustained international development programs.

The University of Puerto Rico will attempt to respond to AID requests for assistance whenever professional expertise is available. However, without the support from a 211(d) grant, UPR staff will not always be able to comply with AID requests because of the pressure of other duties. Linkages with LDC and international institutions as well as with the sister universities of COST cannot be maintained with UPR funding alone. The net effect of the termination of AID funding at this time would be a decrease in the faculty's involvement in international programs, a diminution of the quality of research now performed at UPR, and a gradual loss of the institutional competency built up through the original grant.

V. Revised Grant Project Design:

The revised grant will focus on the subject of classification and characterization of the soils of the tropics. Its purpose will be to sustain, develop, and utilize UPR's response capability in the subject field for land resource appraisal, land use planning and agrotechnology transference, thereby accelerating agricultural development in LDCs. The redefinition of the subject matter area has been proposed by the University because the vaguely defined original topic, "Conservation and Protection of Soils of the Tropics", was too broad and too complex. Given the constraints as regards staff and facilities, UPR felt that it could not develop the comprehensive knowledge base envisioned in

original grant. In the redefined grant the initial activities would be focused on:

- * correlating units of systems of soils classification used in used in tropical LDCs with taxa of U.S. soils taxonomy
- * analytically characterizing key soils of the tropics
- * compiling soil maps and soil survey reports of tropical countries
- * developing a storage and retrieval system for analytical data of important soils of the tropics (soil data bank)

The long term activities of the grant would include:

- * classification and characterization of the soils at the major agricultural experiment stations of the tropics
- * development of new and/or additional criteria for classifying tropical soils
- * correlation of soil analytical methods used in different tropical countries

The objectives of the UPR grant will compliment and supplement the Cornell University grants' objectives. The latter would appraise land resources for assessing crop production potential of soils of the tropics under different levels of technology and will use the U.S. taxonomic system as the base and a guide to achieve its objectives. These two grants would work very closely. It is anticipated that a number of activities for Cornell University grant would take place in Puerto Rico.

While recognizing that UPR is not necessarily the best institution to be entrusted with the subject matter under consideration it can justifiably serve as a focal point, particularly on the basis of its professional experience related to classification, its instrumen-

tal capacity, and its geographical location.

The expected outputs generated by the grant extension can be grouped in the following categories:

1. Expanded Knowledge Base: Research efforts will be directed at obtaining a comprehensive knowledge of the major systems of soil classification used in the tropics and how they can best be utilized for increasing food production on small farmer fields in LDCs.

State-of-the-art reviews to be conducted will include an inventory and analysis of existing soil survey programs in LDCs. These studies involve field and literature studies on the extent and adequacy of soil surveys carried out in tropical LDCs, analysis of the soil classification systems applied in this process, a critical evaluation of the soil survey programs with respect to their usefulness for agricultural development, and the identification of knowledge gaps.

Studies will be conducted to correlate the units of the various systems of soil classification used in LDCs with taxa of the U.S. Soil Taxonomy in order to facilitate the transfer of agrotechnology. Because the classification of tropical soils has lagged behind that of temperate region soils it is still incomplete. Further research will, therefore, emphasize the identification of soil parameters unique to tropical soils which could be employed in their classification. Other studies will be initiated to correlate the different methods of analytical soil characterization used in different countries.

The University, in cooperation with the Soil Conservation Service of the USDA, will work with soil scientists in tropical areas to re-

examine the definitions in Soil Taxonomy of classes of tropical soils with low cation exchange capacity. Redefinitions regarding tropical soils may be necessary to ensure that the classes established in Soil Taxonomy provide reasonable and meaningful groupings of soils. The University intends to hold workshops on this subject, one in Latin America and one in Africa.

2. Advisory Capacity: To have the required flexibility to respond quickly and adequately to requests for technical assistance to LDCs and to accomplish the outputs defined in the revised grant, UPR is making a special effort to recruit two new staff members for the Agronomy and Soils Department. That will also provide release time for other faculty. The grant will also fund a small amount, not to exceed \$10,000 per year, for consultancy time to be provided in emergency situations where individuals are needed on very short notice and when other instruments cannot be used without causing unacceptable delay. The UPR faculty members will teach, consult and perform application oriented research with special consideration to problems in developing nations and will participate in the state-of-the-art studies where UPR is taking the subject matter leadership or is cooperating with sister institutions of COST.

3. Education and Training: A program specifically addressed to problems of LDCs will be developed to include non-degree training for decision makers and technicians through short courses, workshops, etc. UPR is a co-sponsor to an international seminar that will be held at ICRISAT in January, 1976 on "The Uses of Soil Survey and Classification

in Planning and Implementing Agricultural Development in the Tropics". Soil Scientists and agricultural planners from 25 African and Asian developing countries will exchange experience and ideas with scientists from U.S. and other developed countries. A post-seminar field trip will acquaint the participants about the land problems and usage of soil survey and classification for planning purposes in a developing country.

The University will continue to recruit students from LDCs into the academic programs in tropical soils management. The new soils courses initiated under the original grant will continue to be offered. If knowledge gaps identified through state-of-the-art studies and other reviews indicate the need for special purpose training, a relevant on-site program will be developed.

4. Information Capacity: To develop an effective means for assistance in the transfer of agro-technology to the LDCs, the University of Puerto Rico will compile and maintain an up-to-date information center of special competence in the broad area of soil classification systems for the tropics. This will involve a collection of all available soil maps as well as published and unpublished soil survey reports. Parallel to this and in coordination with the University of Hawaii and Cornell University, a storage and retrieval system for analytical, environmental and production data of important tropical soils will be developed (a soil data bank). For this purpose key soils of the tropics will be analyzed chemically, physically and mineralogically.

5. Linkages and Networks: Relationships with a network of domestic, multilateral and LDC organizations will be maintained for the purpose of collaborating in joint problem solving approaches, developing cooperative research, initiating faculty exchange and becoming involved in information exchange and dissemination. The important domestic linkages are the sister universities of COST, CID and the Soil Conservation Service of the USDA. Prominent among the international linkages is FAO of the United Nations. Linkages with LDCs exist in Colombia and Brazil and will be expanded as the state-of-the-art studies progress. To maximize subject field utilization in LDCs the University will spend at least 2 man-months per year (2 people, a month each) with AID/Washington to: a) sufficiently understand AID's short term and long term goals, b) explain updated institutional response capability to the Bureaus, and c) establish smooth personal linkages with the Bureau personnel.

The proposed budget shown below by input and output program categories is subject to detailed negotiation with the University. It will fund the activities in soil classification (described above) and in the biological nitrogen fixation program (presented separately).

March 1976 to March 1978

INPUTS

Salaries and Benefits	\$180,000
Travel	40,000
Equipment and Supplies	30,000
Library and Publications	40,000
Other	<u>10,000</u>
TOTAL	\$300,000

OUTPUTS

	<u>Soil Classification</u>	<u>Biological N-fixation</u>
Knowledge base	80,000	40,000
Advisory capacity	30,000	15,000
Education and training	30,000	15,000
Information capacity	40,000	20,000
Linkages	<u>20,000</u>	<u>10,000</u>
TOTAL	\$200,000	\$100,000

The University's on-going program in tropical agriculture, supported by the Commonwealth of Puerto Rico and federal funding is largely directed towards local and regional needs. AID's goal is to build on this existing expertise and add momentum to the University's commitment to international agriculture. The University now provides a significant input to the program. The grant provides no overhead, therefore, such items as office space, laboratories, utilities and some supplies are provided by the University. In addition, a significant portion of faculty and administration time is made available

for grant or grant oriented activities without charge.

VI. Complementary Actions and Management Considerations

This grant is planned as an extension and revision of the existing 211(d) grant of the University of Puerto Rico and is part of a much larger package of Agency activities and relationships. UPR's grant is closely related to those of other COST universities, particularly Cornell University.

The University has recently been awarded a research contract addressing the transference of crop production technology on the basis of soil classification. The expected outputs of the grant complement the research performed under the contract.

Recent administrative changes at the University of Puerto Rico are anticipated to result in a complete integration of the three entities of UPR's College of Agriculture - Faculty, Extension Service and Experiment Station. This will enable a more significant involvement of the Experiment Station in grant policies and activities. Three professionals from the Experiment Station are already working on UPR's research contract. It is expected that at least one other Experiment Station scientist will be assigned to the grant.

The focal point within AID for technical, substantive and managerial aspects of this grant will be the Soil and Water Management Division, Office of Agriculture, Technical Assistance Bureau (TA/AGR). Liaison with the University of Hawaii will be through the Grant Project Officer, Dr. Tejpal S. Gill. Contacts with AID missions will be handled through

TA/AGR and appropriate Bureaus, and the University will initiate and sustain contacts with other research and educational institutions, both within the U.S. and abroad, on a direct basis.

Demand imposed on AID offices, other than TA/AGR, by management of the grant should be quite limited. Regional Bureaus and field personnel will, however, be contacted for advice and consultation on research, state-of-the-art, and training aspects and invited to participate in grant-sponsored activities.

The grant should continue to be centrally funded and managed to take advantage of cooperative relationships with the related centrally funded and managed programs, to permit a global sphere of influence and study, to allow for interregional coordination and cooperation among agencies and international centers, and to facilitate management within AID.